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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/065,345      | 10/07/2002  | Ko-Hsing Chang       | 9069-US-PA          | 2212             |

31561 7590 06/18/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER

DANG, PHUC T

ART UNIT PAPER NUMBER

2818

DATE MAILED: 06/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|  |  |   |  |
|--|--|---|--|
| <p align="center"><b>Office Action Summary</b></p> | <p>Application No.</p> <p>10/065,345</p> | <p>Applicant(s)</p> <p>CHANG ET AL.</p> |  |
|  | <p>Examiner</p> <p>PHUC T DANG</p>       | <p>Art Unit</p> <p>2818</p>             |  |

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on election filed on April 26, 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 14-17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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## **DETAILED ACTION**

### **Election/Restrictions**

1. Application's election filed on April 26, 2004 is acknowledged and considered.

In the election, Applicants selects Group I, claims 13-20 and cancels Group II, claims 1-12.

Applicants have the right to file a divisional application covering the subject matter of the non-elected claims.

Claims 13-20 are pending in this application for examination.

### **Oath/Declaration**

2. The oath/declaration filed on October 7, 2002 is acceptable.

### **Specification**

3. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### **Claim Rejections - 35 USC § 102**

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was

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made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 13 and 18-20 are rejected under 35 U.S.C. 102 (e) as being anticipated by Lin et al., hereinafter "Lin" (U.S. Patent No. 6,583,466 B2).

Lin discloses a trench flash memory device, comprising:

a substrate (11, Fig. 1E) having a trench (18, Fig. 1E);

a gate structure, which is located in the trench (18, Fig. 1D) and has the following components from outside to inside of the trench: a tunnel oxide layer (22, Fig. 1H), the floating gate (FG, Fig. 1I), a gate dielectric layer (30, Fig. 1J) and a control gate (PS2, Fig. 1J), wherein the tunnel oxide layer, the floating gate and the gate dielectric layer wrap around the control gate;

a source region (S, Fig. 1J) which is located in the substrate around the bottom of the trench (18, Fig. 1J); and

a drain region (D, Fig. 1J) which is located in the substrate adjacent to the top of the trench (18, Fig. 1J) [col. 2, lines 53-col. 5, lines 5].

Regarding claim 18, Lin discloses the gate dielectric includes silicon oxide/silicon nitride/silicon oxide layer [col. 4, lines 46-48].

Regarding claim 19, Lin discloses the floating gate has a top surface lower than the upper surface of the substrate [Fig. 1J].

Regarding claim 20, Lin discloses the control gate has a top surface higher than the upper surface of the substrate [Fig. 1J].

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### **Allowable Subject Matter**

5. Claims 14-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

None of the prior art of record suggests or disclose a trench flash memory device further comprising a first well region having a first conduction type, formed in the substrate and connected with the source region; a second well region having a second conduction type, formed above the first well region; and a third well region having the first conduction type formed in the substrate, which connected the second well region with the first well region as disclosed in claim 14.

Claims 15-17 are depend on claim 14, then, they also would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

### **Conclusion**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

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8. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

PD

A handwritten signature in cursive script, appearing to read "Langphuc", written in black ink.

Primary Examiner

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